

Corner's Architectural Model

by

F. HALLÉ

&

D. J. MABBERLEY

*Institut de Botanique
Montpellier, France*

*Botany School, Oxford
England*

Vegetatively unbranched trees with indeterminate apical growth and lateral sexuality belong to 'Corner's Model', as previously defined (Hallé & Oldeman, 1970). The papaya tree and the oil palm are familiar examples of this strange and probably very old strategy of growth. The monoaxial trunk, often thick in its primary tissues, is built by the activity of a single apical meristem; the leaves are large, often compound, and the internodes are short. Growth may be continuous or rhythmic; cauliflory is frequent in the Angiosperm examples. From an ecological point of view, they are mainly treelets of the tropical rain-forest undergrowth.

Although flowering before branching, these trees are not necessarily unbranched throughout their lives, e.g. old papaya trees produce branches from buds on the trunk; see also Plate I. This repetition of the original model, for each new branch behaves as did the first axis, is the 'réitération' of Oldeman (1974). Again, damage to the apex sometimes leads to the death of some species, e.g. *Cyanea carlsonii* Rock (Degener, Degener & Hörmann, 1969), but others can recover, as their axillary buds grow out, giving a branched tree.

Corner's Model is important in the tropics, as it occurs in nearly all the larger families of flowering plants. A list of 67 trees was published in 1970 by Hallé & Oldeman; now more than a hundred species are known to be monoaxial, but the present list is likely to expand rapidly in the coming years, with the increasing interest in, and knowledge of, tropical tree architecture.

Taxonomic Distribution

The list below includes that of Hallé & Oldeman (1970: 21-5; 135), examples from which are indicated by an asterisk; bibliographic references to these are to be found in the original list.

DICOTYLEDONS

ANACARDIACEAE†

Semecarpus magnifica K. Schum., New Guinea (F. Hallé, 1974)

Semecarpus sp., Malaysia, *Mabberley 1668* (Plate 1)

**Trichoscypha ferruginea* Engl., Equatorial Africa

BALANOPACEAE

Balanops pancheri Baill., New Caledonia (J. M. Veillon, ined.)

BERBERIDACEAE

Mahonia bealei Carr., China; "Les Cèdres" Botanical Garden, Saint-Jean-Cap-Ferrat, France, 1973

† *Harpephyllum caffrum* Bern. exkr., grown from seed, has flowered at Oxford without branching, while this paper was in press.

BIGNONIACEAE

Colea lantziana Baill., Madagascar, Tsimbazaza Botanical Garden, Tananarive. 1974

Colea nana Perrier, Madagascar; Tsimbazaza Botanical Garden, Tananarive, 1974

Colea sp., Madagascar, Mabberley 822 (1971)

CAMPANULACEAE — LOBELIOIDEAE

Brighamia rockii St. John, Hawaii (St. John, 1969)

Cyanea aspleniifolia (Mann) Hillebr., Hawaii (Rock, 1919)

Cyanea carlsonii Rock, Hawaii (Degener, Degener & Hörmann, 1969)

Cyanea giffardii Rock, Hawaii (Rock, 1919)

Delissea undulata Gaud., Hawaii (Rock, 1919)

CARICACEAE

**Carica papaya* L., Central America, now pantropical

**Carica* sp., French Guyana

COMPOSITAE

**Espeletia spicata* Sch. Bip. ex Wedd., S. American mountains

CONNARACEAE

**Jollydora duparquetiana* (Baill.) Pierre, Equatorial Africa

CUNONIACEAE

Cunonia macrophylla Brongn. & Gris., New Caledonia (J. M. Veillon, ined.)

EUPHORBIACEAE

**Agrostistachys borneensis* Becc., Malaya and Borneo

**Agrostistachys sessilifolia* Pax & Hoffm., Malaya (see F. Hallé, 1971)

Cleidion lasiophyllum Pax & Hoffm., New Caledonia, (J. M. Veillon, ined.)

Euphorbia ankarensis Boiteau, Madagascar (G. Cremers, ined.)

Euphorbia bupleurifolia Jacq., South Africa (G. Cremers, ined.)

Euphorbia lophogona Lam., Madagascar; "Les Cédres" Botanical Garden, Saint-Jean-Cap-Ferrat, France, 1973

Euphorbia moratii Rauh, Madagascar (G. Cremers, ined.)

**Pycnocoma angustifolia* Prain, West Africa (see F. Hallé, 1971)

FLACOURTIACEAE

Phyllobotryon spathulatum Muell. Arg., (including **P. soyauxianum* Baill.)
Equatorial Africa (Richards, 1952; Letouzey, Hallé and Cusset, 1969)

GERANIACEAE

Geranium canariense Reuter, Canary Islands (Yeo, 1970)

GESNERIACEAE

Boea lanata Ridl., Malaysia (Burt, 1964)

LAURACEAE

Litsea ripidion Guill., New Caledonia (J. M. Veillon, ined.)



Plate I. *Semecarpus* sp., *Mabberley 1668* — Sepilok Forest Reserve, Sabah, Malaysia, 8 May 1974.

LECYTHIDACEAE

Barringtonia calyptracalyx K. Schum., New Guinea (F. Hallé, 1974)

**Grias* sp., Brazil

LEGUMINOSAE-MIMOSOIDEAE

Pithecellobium hansemanii (F. Muell.) Muhl., New Guinea (F. Hallé, 1974)

LEGUMINOSAE-PAPILIONOIDEAE

Angylocalyx oligophyllus Bak.f., Tropical Africa (Mangenot, 1975)

Sophora sp., New Caledonia (J. M. Veillon, ined.)

MALVACEAE

Goethea strictiflora Hook., Brazil; J. N. Maclet Botanical Garden, Tahiti, French Polynesia, 1973

MELIACEAE

Aglaia sp., Malaysia, *Mabberley 1699* (1974)

Chisocheton macranthus (Merr.) Airy Shaw, Malaysia, *Mabberley 1718* (1974)

Chisocheton medusae Airy Shaw, Malaysia, *Mabberley 1680* (1974)

Chisocheton polyandrus Merr., Malaysia, *Mabberley 1688* (1974)

Chisocheton princeps Hemsl., Malaysia, *Mabberley 1561* (1974)

Chisocheton setosus Ridl., Malaysia, *Mikil SAN 30162* (1963)

Dysoxylum urens Val., Indonesia; Bogor Botanical Garden, 1972

**Guarea richardiana* A. Juss., French Guyana

MENISPERMACEAE

Penianthus sp. Gabon, *N. Hallé 4056* (1966)

MORACEAE

**Ficus theophrastoides* Seem., Solomon Islands

MYRSINACEAE

Oncostemon sp., Madagascar (J. L. Guillaumet, ined.)

Rapanea grandifolia S. Moore, New Caledonia (J. M. Veillon ined)

Tapeinosperma pachycaulum St. & Whitm., Solomon Islands (Stone & Whitmore, 1970)

Tapeinosperma cristobalense St. & Whitm., Solomon Islands (Stone & Whitmore, 1970)

Tapeinosperma sp., New Ireland (M. Coode, ined.)

Gen. dub., Rondonia, Brazil, *F. Hallé 2351* (1975)

MYRTACEAE

Jambosa acris Panch., New Caledonia (J. M. Veillon, ined.)

OCHNACEAE

**Campylospermum duparquetianum* (Baill.) Van Tiegh., Tropical Africa

**Campylospermum saclexii* (Van Tiegh.) Farron, Tropical Africa

**Campylospermum subcordatum* (Stapf) Farron, Tropical Africa

**Campylospermum zenkeri* (Engl.) Farron, Tropical Africa

PITTOSPORACEAE

- **Pittosporum ceratii* Guill., New Caledonia (J. M. Veillon ined.)

PROTEACEAE

- Hicksbeachia pinnatifolia* F. Muell., Australia; Sydney Botanical Garden, 1972
Macadamia angustifolia R. Viot, New Caledonia (J. M. Veillon, ined.)

RUBIACEAE

- **Bertiera simplicicaulis* N. Hallé, Equatorial Africa
Bikkia macrophylla K. Schum., New Caledonia (J. M. Veillon, ined.)
Captaincookia margaretae N. Hallé, New Caledonia (N. Hallé, 1973)
Coffea macrocarpa A. Rich., Mauritius (G. Mangenot, ined.)
Gardenia conferta Guill., New Caledonia (J. M. Veillon, ined.)
**Pentagonia gigantifolia* Ducke, Peru
Pseudomantalania macrophylla J. F. Leroy, Madagascar (Leroy, 1973)

SAPINDACEAE

- **Chytranthus longiracemosus* Gilg ex Radlk., Tropical Africa
**Chytranthus manganotii* N. Hallé & Assi, Tropical Africa
**Chytranthus pilgerianus* (Gilg) Pellegr., Gaboon
**Chytranthus welwitschii* Pellegr., Gaboon
Deinbollia sp., Banco Arboretum, Ivory Coast, 1967
Jagera serrata Radlk., Papua New Guinea, *Frodin & Mabberley UPNG 4305* (1974)
**Placodiscus bancoensis* Aubr. & Pellegr., Ivory Coast
**Radlkofera calodendron* Gilg, Gaboon

SAPOTACEAE

- **Delpydora gracilis* A. Chev., West Africa
**Delpydora macrophylla* Pierre, Equatorial Africa
Planchonella pronyensis Guill., New Caledonia (J. M. Veillon ined.)

SIMAROUBACEAE

- **Brucea antidysenterica* Lam., Ivory Coast
**Eurycoma longifolia* Jack, Malaysia

SOLANACEAE

- aff. *Solanum*, Acre, Brazil, *F. Hallé 2352* (1974)

STERCULIACEAE

- **Chlamydocola chlamydantha* (K. Schum.) Bodard, Tropical Africa
**Cola buntingii* Bak.f., West Africa
**Cola caricaefolia* (G. Don f.) K. Schum., West Africa
**Cola mahoundensis* Pellegr., Equatorial Africa
Herrania albiflora Gaudot, Tropical America; Bogor Botanical Garden, 1972
**Ingonia digitata* (Mast.) Bodard, West Africa
**Theobroma mariae* K. Schum., Tropical America

SYMPLOCACEAE

- Symplocos stravadioides* Brongn. & Gris., New Caledonia (J. M. Veillon, ined.)

THEOPHRASTACEAE

- **Claviija lancifolia* Desf., French Guyana
- **Claviija longifolia* (Jacq.) Mez, Tropical America

URTICACEAE

- Dendrocide moroides* (Wedd.) Chew, Australia; "Les Cèdres" Botanical Garden, Saint-Jean-Cap-Ferrat, France, 1975
- Obetia radula* (Bak.) B. D. Jackson, Madagascar, *Mabberley* 752 (1971)

VERBENACEAE

- Oxera coriacea* Dubard, New Caledonia, *J. M. Veillon* 2574 (1973)

VIOLACEAE

- **Allexis cauliflora* (Oliver) Pierre, Equatorial Africa
- Neckia serrata* Korth., Indonesia, (Boerlage & Koorders, 1901)

MONOCOTYLEDONS

AGAVACEAE

- **Nolina recurvata* Hemsl., Mexico

PALMAE (Corner's is the main architectural model within the family — see Corner (1966) and Whitmore (1973). The following is a short list of typical examples)

- Borassus aethiopum* Mart., Tropical Africa
- **Cocos nucifera* L., pantropical
- Dypsis hildebrandtii* Becc., Madagascar; Tsimbazaza Botanical Garden, Tananarive, 1971
- **Elaeis guineensis* Jacq., Tropical Africa
- Lodoicea maldivica* (Gmel.) Pers., Seychelles
- **Mauritia flexuosa* Benth., Hook.f. Tropical America
- Oenocarpus distichus* Mart., Brazil
- **Phytelephas macrocarpa* Ruiz & Pav., Colombia
- **Roystonea oleracea* O. F. Cook, Central America
- Verschaffeltia splendida* H. Wendl., Seychelles

PANDANACEAE

- Pandanus danielmannianus* K. Schum., Solomon Islands (Stone, 1972)
- Pandanus princeps* B. C. Stone, Madagascar (Stone, 1970; Guillaumet, 1973)

OTHER VASCULAR PLANTS, LIVING OR FOSSIL

FERNS

- **Caulopteris* sp., fossil
- **Hagiophyton* sp., fossil
- **Megaphyton* sp., fossil
- **Psaronius* sp., fossil
- **Alsophila australis* R.Br., Tasmania